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## MIRROR AND IMAGE DISPLAY SYSTEM

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### BACKGROUND OF THE INVENTION

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It is known to marketeers that cosmetics are more readily purchased if they can be tested and sampled by customers. Because make-up items are typically nonexchangeable, consumers find it helpful to use the make-up and see it as applied before they purchase the product. For that very purpose, sample cosmetics labeled "testers" are often seen at cosmetics counters. Hence, as a marketing ploy, as well as a convenience to shoppers, cosmetics counters almost always provide a table-top vanity mirror.

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As a further marketing ploy for cosmetics (if not all consumer items), informational commercials and promotional segments are often played within view of sales counters, or sometimes directly on the sales counters. VCR's and other comparable electronic equipment are used effectively in this capacity, as a relatively nonintrusive means to educate and entertain the shopper. A shopper may choose to watch the infomercials or video segments and do so without disturbing others. In this regard, an undecided shopper may well commit to a purchase once the shopper understands how the product is used or becomes informed on the benefits of the product.

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Many retail establishments in promoting cosmetics also conduct in-store, live demonstrations by make-up artists who work directly with willing participants. The interactive nature of such demonstrations is invaluable in terms of enabling shoppers to simultaneously experiment with the products demonstrated and seek the advice of professionals. In this regard, a shopper may be more inclined to purchase a product once she knows which product best suits her needs and desires.

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The aforementioned tactics work best when employed in combination with each other. However, the ability to combine these tactics with each other or with other marketing ploys may be hampered due to space and time constraints. Counter space and floor space in retail establishments are often limited. Moreover, time is of the essence in terms of capturing a shopper's attention. Furthermore, many finer retail establishments follow strict guidelines on maintaining their premises clean and orderly. Cluttered countertops and floor space pose a eye-sore for shoppers, if not also a safety hazard for shoppers and employees alike. Consequently, there is a desire to combine the foregoing marketing ploys in a manner that is both aesthetically pleasing and functionally efficient in terms of space and time.

SUMMARY OF THE INVENTION

The present invention is directed to a vanity console display system, comprising a vanity console, a variety of video image sources capable of providing different images, and a control unit. The vanity console has a mirror, an image display and a touch screen positioned on the mirror for use with the image display. The mirror has reflective and transmissive properties and the image display is positioned relative to the mirror such that it is hidden by the mirror and unseen to the user unless activated to provide an image that is transmitted through the mirror to the user. The control unit is connected to the various video image sources and is configured to receive user input signals from the touch screen for selecting and controlling the video image sources. As such, the transmitted image seen by the user may be varied as desired and selected by the user through the use of the touch screen.

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1        The video image source may be a video cassette player or a  
5        digital video disc player for entertaining, informing or  
educating the user, or even a face or body scanner such that  
"before and after" make-up tests may be conducted. The system  
5        may also include a printer or a projector responsive to the user  
input signals to print or project images from the video image  
sources. The system may further provide illumination devices so  
as to simulate "day-time" lighting or "night-time" lighting to  
10      assist the user in applying make-up.

15      The system may yet further be adapted to enable the  
application of cosmetics virtually, by providing a processor  
within the control unit to process the video image signals of a  
scanned body part, such as eyes, lips or even hands. The system  
15      may be rendered as interactive as desired by the user through the  
touch screen.

20      These, as well as other features of the invention, will  
become apparent from the detailed description which follows,  
considered together with the appended drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25      In the drawings, which constitute a part of this  
specification, exemplary embodiments demonstrating various  
features of the invention are set forth as follows:

30      FIGURE 1 is a perspective plan view of an embodiment of a  
mirror and image display system of the instant invention;

35      FIGURES 2A is side elevational view of an embodiment of a  
vanity console of the present invention (without a touch screen  
or a front frame member);

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FIGURE 2B is back elevational view of an embodiment of a vanity console of the present invention;

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FIGURE 2C is an exploded perspective view of an embodiment of a vanity console of the present invention; and

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FIGURE 3 is a block electrical circuit diagram showing the electrical circuit employed for an embodiment of the system of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

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Referring to FIG. 1, the present invention is directed to a mirror and image display system 10 for use on counters, tables and the like. It may be used with cosmetics sales counters, jewelry sales counters, or with any sales counters which may benefit from a customer being able to see a reflection of his or her face or a body part. The system may also have use and application in a noncommercial setting, such as by individuals in a personal or private setting.

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In a preferred embodiment of the invention, the system 10 includes a vanity console 12 having a mirror 14 and an image display 16 positioned behind the mirror and therefore hidden from a user unless activated to transmit images. To that end, the image display is adapted to receive video image signals and to work in conjunction with a touch screen 18 that is positioned on the mirror. The system further has a control unit 20 which is adaptable to provide many functions, and a plurality of video image sources 24 to output the video image signals to the image display 16.

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Referring to FIGS. 2A-2C, the vanity console 12 includes a stainless steel housing 26 comprising a plate member 27 and a back frame member 29 which together provide a cavity 28

1 therebetween in which the image display 16 is situated. The  
5 plate member 27 is configured with an opening 30 which receives  
the screen of the image display 16, and the image display 16 may  
be configured with a flange 32 by which the image display 16 is  
10 mounted onto the plate member 27 by screws 37, or the like. The  
plate member 27 is affixed to the back frame member 29 by screws  
39, or the like. Also, situated in the cavity is an audio  
15 speaker 25 connected and configured within the system to transmit  
to the user any audio component from the video image sources.  
To that end, audio apertures 34 are provided in the plate member  
27. Ventilation slots 44 are also provided.

15 The mirror 14, in turn, is mounted on to the plate member  
20 27 by fasteners, for example, Velcro® tabs 31. The touch screen  
25 18 is positioned on the mirror's outer surface so that the touch  
screen 18 may be accessed by a user. The touch screen 18 is  
30 transparent so that the video image on the image display 16 is  
visible through it. The touch screen may be, for example, a  
glass panel which is configured and shaped to correspond to the  
shape of the image display's screen. One type of touch screen  
35 is fitted with a number of relatively short spaced-apart linear  
electrodes extending along the perimeter of the touch screen.

25 An open front frame member 33 may be positioned outside of  
the touch screen 18 to secure and protect the touch screen 18.  
The front frame member 33 may be configured such that it readily  
snaps onto outer edge of the mirror 14 and plate member 27.  
30 Electrical connections for the touch screen 18 may be  
aesthetically routed within the front frame member 33. Moreover,  
the plate member 27 may be configured with aperture(s) to allow  
such electrical connections to be routed into the cavity 28 of  
the housing 26.

35 Supporting the housing 26 are a base 40 and a support arm  
42 which also may be of stainless steel. The housing may be

1 rigidly mounted on the support arm 42, or fasteners, such as pins  
5 and brackets may be used so that the housing is pivotable. The  
support arm 42 is of a hollow construction such that electrical  
connections or couplings to and from the vanity console 12 can  
be accomplished without being visible to the user of the present  
invention.

10 The mirror 14 has reflective characteristics such that its  
entire useable surface can be reflective to the user, for  
example, for applying make-up. However, the mirror also has  
transmissive characteristics such that when and where the image  
display 16 is activated to display an image, the image is  
transmitted and therefore visible to the user through the mirror  
14. For purposes of describing the invention hereinafter, the  
15 mirror will be described as having a "reflected" image portion  
(or area) defined by the mirror's surface, and a "transmitted"  
image portion (or area) defined by the screen of the image  
display 16, even though it is understood that the mirror has  
substantially both reflective and transmissive characteristics  
20 throughout its surface.

25 In view of the foregoing, the mirror 14 has a reflected  
image portion 52 no greater than the entire useable mirror  
surface, and a transmitted image portion 50 lesser than the  
entire useable mirror surface defined by the screen of the image  
display 16 when operating. The touch screen 18 is positioned on  
the mirror 14 for use with the image display. As such, the user  
uses the system 10 by directing or "communicating" with the  
control unit via the touch screen. Such a function is to enable  
30 the user to select the image shown on the image display 16.

35 Any desired number of touch fields (or soft switches) 60 is  
provided by the touch screen 18. The touch fields 60 may include  
a variety of commands for operating the system 10, including

1 commands to selectively control and actuate the video image  
2 sources 24.

5 The image display 16 can be a commercially available monitor  
equipped with a built-in light source suitable adopted to achieve  
and perform the video display function according to the  
invention. Alternatively, the image display can be a  
10 conventional flat screen color LCD type monitor. In any case,  
it is preferred that the display screen be of a suitable size  
relative to the size of the mirror such that the remaining  
reflected image portion of the mirror while the video image is  
being transmitted provides a suitable area of reflection for the  
user. For example, the display screen may be of a relative one-  
15 half to one-quarter the area of the mirror, such that the  
transmitted video image occupies one-half to one-quarter of the  
area of the mirror.

20 The base 40 of the vanity console may also provide other  
user input devices additional to the touch screen, such as  
selector switches 62. The switches 62 function comparably to the  
touch screen in terms of enabling the user to use the system 10.  
Like or in addition to the touch screen fields 60, the switches  
25 62 may be video source selector switches or they may actuate  
other electrical components of the system 10.

30 In accordance with the present invention, at least certain  
of the touch screen fields 60 and the selector switches 62 are  
configured to enable the user to select the source of the video  
signals provided to the image display 16. In the context of the  
touch screen fields 60, the user at the prompting of suitable  
graphics or images on the image display 16, as controlled by the  
control unit 20, touches the field which corresponds to the video  
35 image source 24 she wishes to select. Referring again to FIGURE  
1, the video image sources 24 may include prerecorded and/or live  
video signal sources. Such video signal sources may be, for

1 example, a color face/body scanner 70 and a digital camera 72 for  
5 providing prerecorded video signals of still images, a video  
cassette player 74 and a digital video disc player 76 for  
providing prerecorded video signals of dynamic images, and a  
10 video camera 78 for capturing and/or providing live, real-time  
video signals of still or dynamic images. Whereas the entire  
useable surface area of the mirror 14 is reflective to the user  
when the image display 16 is inactive or not actuated, the mirror  
14 is transmissive in the region of the screen of image display  
15 once the image display is operating or actuated.

15 The provision of prerecorded video images and live video  
images enables the system to flexibly accommodate the desires and  
needs of the user. Indeed, the possible uses and applications  
of the system depend in part on the imagination of the user. For  
example, the user may be educated, informed or entertained by the  
transmitted images in accordance with the user's selection of the  
various video image sources 24. Or, the user can conduct a  
20 "before and after" session to compare images of herself with and  
without cosmetics. By using the digital camera 72 or the scanner  
70, the user first captures or scans in a "before" image of her  
face (or any other suitable body part). Thereafter, having  
applied the cosmetics, e.g., lipstick or nail polish, the user  
25 can compare the made-up body part (or "after" image) with her  
"before" image. In particular, by selecting the appropriate touch  
field(s) 60 for the system to display the "before" image on the  
image display 16, the user can look at the mirror and  
simultaneously see the transmitted "before" image along with the  
reflected "after" image.  
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35 Furthermore, the user by selecting the video player 74 or  
76 as the selected video image source is able to experience and  
view through the transmitted image portion 52 of the mirror 14  
a prerecorded video instructing on make-up application  
techniques. Or, the user by selecting the video camera 78 as the

1       video image source can experience and view through the  
transmitted image portion 52 of the mirror a live demonstration,  
e.g., on make-up removal techniques, held at a remote locate that  
5       is captured by the video camera. The system 10 may even be  
adapted to process or alter the video signals so that cosmetics  
may be applied virtually, as explained in detail further below.

In the context of processing video signals, the system 10  
10      can be adapted to allow the user to experiment with cosmetics  
virtually. To that end, the scanner 70 or the digital camera 72  
of the system provides the system with video signals  
representative of the user's face or body. The user then selects  
via the touch screen a particular alteration, that is, a  
15      particular "cosmetics" to be applied virtually. As understood  
by one of ordinary skill in the art, the control unit 20 may  
include a processor adapted to process the video signals in  
accordance with the selection made by the user. For example,  
where the user's face is captured or scanned in and the user  
wishes to sample a shade of lipstick, the processor "applies" the  
20      selected shade of lipstick to the video image. In accordance  
with the selected virtual lipstick made by the user via the touch  
screen 18, the processor processes the video signals to generate  
an altered image bearing the selected shade of lipstick  
substantially in the region of user's lips in the video image.  
The processed video signals are then outputted from the processor  
25      to the image display which then displays the altered image to the  
user as a transmitted image through the mirror. In this manner,  
the user may experiment virtually with different lipstick shades,  
or any suitable cosmetics, without having to actually apply the  
30      cosmetics to the user's face or body.

The system is also configured to enable the user to activate  
other electrical components, such as special showcase  
35      illumination around the mirror, a printer 92 and/or a projector  
94. The selector switches 62 on the base 40 of the vanity

1       console 12 may be used to activate these components. The showcase  
illumination may include lighting elements 90 to generate  
illumination comparable to "daytime" lighting. The switch 62a  
5       may actuate additional lighting elements 91 or modify the  
intensity and/or shade of the lighting elements 90 to provide  
illumination comparable to "nighttime" lighting. Electrical  
connections may again be aesthetically routed within the front  
frame member 33.

10      Furthermore, switch 62b may be configured to activate and  
control the printer 92 to print an image captured or scanned into  
the system 10 and/or shown on the image display 16. The printer  
92 may also be used to print other information such as  
15      preprogrammed information on the purchase of cosmetics products.

20      Moreover, switch 62c may be configured to activate and  
control the projector 94 for displaying to an audience on a large  
screen any image(s) including any captured or scanned image or  
preprogrammed image whether such image(s) are displayed on the  
image display 16 at the vanity console 12. The projector 94 may  
be a film projector, a slide projector, or any other projection  
device suitable for use with an audience. It is understood by  
25      one of ordinary skill in the art that the functions performed by  
the switches 62 may be incorporated completely or partially into  
the touch fields 60 of the touch screen 18.

30      Referring to FIG. 3, a block electrical circuit diagram of  
the system 10. The touch screen 18 and image display 16 are  
shown in combination as a touch screen display 100 as understood  
by those of ordinary skill in the art. The touch screen display  
100 is coupled to the control unit 20 via a touch screen  
interface 102 which receives user input signals via connection  
104 and relays the user input signals to the control unit 20 via  
connection 106. The control unit 20, also referred to as a  
35      microcontroller subsystem 108 communicates with the plurality of

1 video image sources 24, such as, the digital camera 72 via  
connection 110, with the scanner 70 via connection 112, with the  
video player 76 via connection 114, with the video player 74 via  
connection 116 and any other video image source including the  
5 video camera recorder 78 via connection 118.

Upon receiving the user input signals through the interface 102, the microcontroller 108 is adapted to activate and control any selected of the video image sources 24 and to receive the output video image signals therefrom. The microcontroller 108 communicates, controls and receives output video image signals from the digital camera via the connection 110 and the scanner via the connection 112. The system 10 provides a switch 120 for receiving output video image signals from the player 76 via connection 122, from the player 74 via connection 124 and from any other video image source 78 via connection 126. The switch 120 relays these output image signals to the microcontroller 108 via connection 128.

In receipt of the output image signals, the microcontroller 108 sends the signals to the touch screen interface 102 via connection 130 which then sends the signals to the touch screen display 100 via connection 132. Any audio signals from the DVD 76, VCR 74 or other image source 78 are also sent along connections 122, 124, 126 and 128.

As understood by one of ordinary skill in the art, the microcontroller 108 is configured and adapted to control the graphics or touch fields 60 displayed on the image display 16 for use with the touch screen 18. Moreover, if the output image signals are to be processed, as mentioned above for applying cosmetics virtually, the microcontroller subsystem 108 is configured to perform such processing on the signals and in turn output such altered or processed image signals to the touch screen display 100. The microcontroller subsystem 100 is

1 programmed so that when the user touches a given field 60, the  
5 system 10 responds accordingly. To use the present system, the  
user touches the fields 60 which correspond to the video image  
source he wishes to select. The touch screen senses each touch  
and generates the corresponding user input signal which  
identifies the field.

10 The audio signals from the DVD 76, VCR 74 or other image  
source 78 are also processed by the microcontroller subsystem 108  
and sent to the speaker 25 along connection 144.

15 The microcontroller subsystem is further adapted to activate  
and control the switch selectors 62 for illuminating the lights  
90 via connections 134, 136 and 138. It is also adapted to  
activate and control the printer 92 via connection 140 and the  
projector 94 via connection 142. In this regard, the  
20 microcontroller subsystem 108 is configured to output to the  
printer 92 or the projector 94 image signals from any of the  
video image sources 24 or any image signals stored in the  
microcontroller subsystem 108, such as promotional or purchase  
information and materials.

25 It may be seen that the system of the present invention may  
be readily incorporated in various embodiments to provide a  
mirror and image display system. In one embodiment, the system  
comprises merely the vanity console 12 and a video image source,  
such as the VCR. As such, the output (video and any audio  
signals) of the VCR is fed directly to the image display 16.  
Upon activation of the VCR, the image display 16, otherwise  
30 hidden behind the mirror 14, is also activated to display  
image(s) in accordance with the VCR output, where such image(s)  
are viewed by the user through the mirror 14.

35 Moreover, in another embodiment of the system, the touch  
screen 18 (with or without the frame 33) may be replaced by or  
used along with other user input devices, such as

1      detection/transducer devices 35 (see FIG. 2C), for receiving  
      commands or input instructions from the user. The devices 35,  
      which can be infrared or proximity sensors, can be positioned on  
5      the plate 27, behind the mirror 14, and be adapted to sense heat  
      from the user's fingers through the mirror 14. To that end, the  
      mirror 14 can be etched, or otherwise marked, so as to indicate  
      to the user the location of the sensors 35 behind the mirror, or  
10     illumination devices can be mounted on the plate 27 for that same  
      purpose. Alternatively, the devices 35 can also be positioned  
      on the mirror 14. For either embodiment, the devices 35 may be  
      electrically connected and configured for operation within the  
      system comparably to the selector switches 62, as illustrated in  
      FIG. 3.

15     It is understood by one of ordinary skill in the art that  
      the various components described hereinabove may assume different  
      configurations all accomplishing the same desirable result. It  
      is also understood by one of ordinary skill in the art that the  
      configurations and dimensions of various components may be  
20     altered and modified as desirable. In that regard, various  
      alternative techniques and configures may be employed departing  
      from those disclosed and suggested herein.

25     Consequently, it is to be understood that the scope hereof  
      should be determined in accordance with the claims as set forth  
      below.

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